CLINICAL & APPROPRIATE USE OF BLOOD

Blood is the main oxygen carrier in the body yet it cannot be used as a tonic. The use of blood should be judicious. The benefits attached to blood transfusion should be weighed against the risks involved with transfusion of blood Since blood can not be sterilized, so there is possibility of transmitting any agent present in red cells or plasma or platelets which has not been detected by routine screening tests for transfusion-transmissible infections, including HIV, hepatitis B & C, other hepatitis viruses, syphilis, malaria etc.

Unlike earlier times, whole blood is now considered as raw material rather than transfusion medium. The only one indication for whole blood transfusion is exchange transfusion. The use of whole blood is obsolete and is now completely replaced by various blood components like:

- Packed Red Cell.
- Leuko reduced red blood cells
- Leuko reduced platelet concentrate
- Fresh Frozen Plasma
- Cryo precipitate
- Cryo poor plasma
- Apheresis blood components

PACKED CELLS

Indications

- Severe chronic anaemia to reduce chances of overload.
- Hypo plastic anaemia
- Hemolytic anaemia especially in aplastic crisis

Advantages

Less blood group antibodies so "O" Negative blood (group-non- specific) can be given to patients with other groups.

Less Plasma proteins with packed cells so there are minimum anaphylactic reactions.

TRANSFUSION TRIGGER

It has now been reduced to 7.5gm/dl as opposed to 10gm/dl being used earlier from surgical and leukemia patients however, transfusion requirement of each patient should be based on clinical status rather than Hb value or Hematocrit.

LEUCOREDUCED RED BLOOD CELLS

Description

A red cell suspension containing <5 x 10^8 white cells per pack, prepared by collecting blood in a special top & bottom blood collection bags (Opti Bags) and using opti press.

Advantages

Prevents febrile non-haemolytic transfusion reactions to a great extent.

Indications

- Severe chronic anaemia to reduce chances of overload.
- Hypo plastic anaemia
- Hemolytic anaemia especially in aplastic crisis

Storage **:** 4 - 6° c

Expiry **:** 35 days – Day of collection zero day.

Administration of Packed / Leucoreduced red blood cells

- Check the identity of patient properly before transfusion
- Must be ABO & Rh D compatible with patients.
- Alternative blood group can be given at times if group specific blood is not available e.g.
- For AB the alternative blood in order of preference should be A, B & O
- For A group ---------- O group
- For B group ---------- O group

- No alternative blood for O group
- Transfuse within 4 hrs.
- Transfuse blood within ½ hr of issue from Blood Bank.
- Blood once issued will not be received back.

Infection risks same as for whole blood.

PLATELET CONCENTRATE

***Description*:**

Derived from single blood donation

***Volume*: ** 65 – 80 ml

Should not have any visible RBC contamination (red cells less than 1.2×10^9 red cells)

Storage: 5 days –(Day of collection zero day) at 22° c $\pm$ 2

Indication :

- Thrombycytopenia of any cause except ITP unless life saving.

§ Platelet functional defects of any cause

Dosage:

1 unit of platelet concentrate / 10 kg body weight eg for 60kg man 6 units of random donor platelets concentrate.

Administration:

- No special transfusion sets required except in patients requiring multiple transfusions.
- No cross matching required, however if contaminated with red cells – cross match is indicated.
- Use group specific platelets, however group non-specific platelets can be used if group specific platelets not available.
- Platelet don't carry Rh antigen however in young ladies of child bearing age, don't give Rh Positive platelets incase there is any RBC contamination.

Complications:

Allergic & febrile transfusion reactions are not uncommon, especially in patients receiving multiple transfusions**. (Use platelet leucocyte filter)**

Infection risks are same as for whole blood.

FRESH FROZEN PLASMA

Description:

- Volume 180 – 220 ml
- Contains stable and labile coagulation factors ,albumin & immuno-globulins
- Factor VIII (20% of normal)

- Fibrinogen 150-230 mg/ pack

Dosage: 10-20ml/ kg body wt.

Indications:

Replacement of multiple coagulation factor deficiencies, which can occur in

§ Liver disease

§ Massive blood loss

§ Over dose of anticoagulants e.g. (Warfarion & Dicumerol)

§ DIC

§ TTP

Storage:

Stored at -20°c below & before use should be thawed at 37°c & once thawed should be stored at 4 - 6°c & used within 24 hrs.

Compatibility Testing

No compatibility testing required but group specific FFP should be used. AB FFP can be used as an alternative FFP if group specific FFP not available.

Complications:

§ Allergic & febrile transfusion reaction

§ Transmission of infections same as for whole blood.

CRYOPRECIPITATE

Description:

Prepared from FFP by thawing it under controlled conditions at 4°c. It contains approximately 80-100 iu of factor VIII & 150-300mg of fibrinogen per pack.

Storage: At - 30°c & below for 1 year.

Indications:

As an alternative factor VIII concentrate in the treatment of: -

§ Vonwillibrand disease

§ Hemophilia A

§ Factor XIII deficiency

§ Fibrinogen deficiency eg D I C

§ **Infection risks are same as for whole blood.**

Dosage:

Depend upon severity of the factor deficiency normally 4-6 packs to be repeated 12 hourly.

Administration:

- To be given immediately within 6 hrs after thawing
- Use standard blood administration set
- No compatibility testing required

CRYO POOR PLASMA

Description:

Plasma which is deficient in factor VIII& fibrinogen but contains all other plasma constituents

Indication:

- For volume replacement
- As replacement fluid in exchange transfusion
- As a source of plasma proteins.

Infection risks are same as for whole blood**.**

FRESH BLOOD

There is no indication of fresh blood today when the blood components are available, as the fresh whole blood is not going to meet the requirements of the patients

APHERESIS BLOOD COMPONENTS

Aphaeresis blood components are gaining importance because;

1. Provide adequate adult dose from single donor.
2. Reduce donor exposure to the patient, thus improves blood safety.
3. Reduce bacterial contamination, especially in platelets.
4. Lower chances of refractoriness to blood components.
5. One donor can donate platelets twice a week provided platelets counts are adequate.

Getting the right Blood to the right patient at right time

1. Assess the Patient's clinical need for blood & when it is required.
2. Inform the patient and/or relative about the proposed transfusion.
3. Record the indications for transfusion in the patient's notes.
4. Select the blood product & quality required. Use a blood-ordering schedule as a guide to transfusion requirement for common surgical procedures.

5. Complete the blood request from accurately and legibly. Write the reason for transfusion so the blood bank can select the most suitable product for compatibility testing.
6. If blood is needed urgently, contact the blood bank by telephone immediately.
7. Obtain & correctly label a blood sample for compatibility testing.
8. Send the blood request form & blood sample to the blood bank.
9. Laboratory performs blood grouping to reconfirm the blood group & selects the unit of blood for cross matching. Cross-matching label is fixed on the unit of blood & feed back form made.
10. Blood is issued to the ward on receipt of issue slip after properly checking the identity.
11. Store blood products in correct storage conditions if not immediately required for transfusion.
12. Check the identity on :
    - Patients
    - Blood Products
    - Patient's documentation.
13. Administer the blood products.
14. Record in the patient's notes:

- § Type & volume of each product transfused
- § Unique donation number of each unit transfusion.
- § Blood group of each unit transfused
- § Time at which the transfusion of each unit commenced
- § Signature of the person administering the blood

15. Monitor the patient before, during and on completion of transfusion.
16. Record the completion of transfusion.
17. Identify and respond immediately to any adverse effect of transfusion & record in the patients file.

RESPONSIBILITIES OF CLINICIAN INCASE THE PATIENT NEEDS TRANSFUSION

1. Inform and explain to the patient or relatives about the proposed transfusion of blood/blood products (**BENEFITS & RISKS**) and record the same in the patient's file.
2. Ensure proper identity of the patient & correctly complete a blood request form.
3. Collect the blood sample from the right patient in the right sample tube & correctly label the sample tube. Order blood in advance, whenever possible.
4. Provide the blood bank with clean information on :

§ The Products and number of units required

§ The reason for transfusion

§ The urgency of the patient's requirement for the patient

§ When and where the blood is required.

5. Ensure the correct storage of blood and blood products in the clinical area before transfusion.

6. Formally check the identity of the patients, the product and the documentation at the patient's bedside before transfusion

7. Correctly record transfusion in the patient's notes

§ Reason for transfusion

§ Products & volume transfusion

§ Time of transfusion

§ Monitoring of the patient before, during and after transfusion

§ Any adverse events.